

## KNOW THE JARGON

### Keystone pathogen:

(n.) A microorganism that, relative to its numbers, plays a disproportionately large role in transforming a benign microbial community into one that can cause disease.

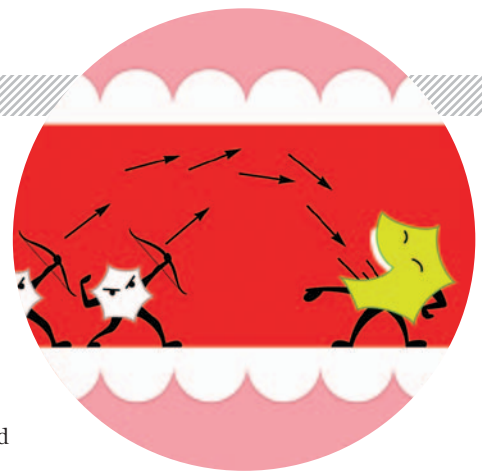
The vast majority of microbes that live in and on our bodies do not put our health at risk, but many can cause problems if their populations grow out of control. So the immune system keeps numbers in check, culling resident bacteria here and there.

A few microbial species have found ways to sabotage the immune system and skew the balance of power in their favor. Take *Porphyromonas gingivalis*, a mouth-dwelling bacterium that has long been the prime suspect behind gum disease. Even in small numbers, *P. gingivalis* can stop white blood cells from producing certain chemicals that kill bacteria. Without these chemicals to restrict their

growth, all the bacterial populations in the mouth—including those that had been contributing to a healthy ecosystem—grow explosively, causing tissue damage known as gingivitis.

In two recent studies, a team of University of Pennsylvania researchers led by dental microbiologist George Hajishengallis untangled the particulars of the mechanism behind *P. gingivalis*'s subterfuge. And with that knowledge, they discovered that blocking a key chemical signal in the pathway returned the microbial communities in the mouths of mice to normal.

The standard care for gingivitis is a professional tooth cleaning and more flossing, which temporarily reduces bacte-



rial numbers but does not restore white blood cells' ability to kill. As such, dentists cannot do much to treat recurring inflammation. The team says the finding may lead to future treatment options.

Keystone pathogens may be the culprits behind other chronic inflammatory diseases too, Hajishengallis says. But to pin down links, scientists need to better understand how keystone bacteria manipulate the checks and balances that allow humans to live in harmony with trillions of microbes. —Diana Crow